The
ALTERNATIVE/EXPERIMENTAL WASTEWATER TREATMENT TECHNOLOGIES TECHNICAL REVIEW COMMITTEE (TRC)

The meeting was held at
95 Cripe Street, North Kingstown, RI

August 24, 2012

Approved Minutes

Present: Ken Anderson, Noel Berg, Russ Chateauneuf, David Dow, George Loomis, Nikki Schultz, Tim Stasiunas and Dennis Vinhateiro
Absent: Susan Licardi

Others Present: Dennis Fogg, Don Prince & Lee Rashkin (Presby, Environmental, Inc), Mike Benton (Norweco, Inc.), Bob Frost and Rob Frost (Sterling Environmental, Inc.), Hollister Siegmund (Siegmund Environmental Services, Inc), Matt Dowling (Town of Charlestown), Brian Moore and Deb Knauss (DEM)

Call to Order: 8:50 AM

Materials Distributed:
- Draft Agenda for this meeting
- Draft Minutes of 6/28/12 meeting
- 7/23/12 Norweco, Inc. reply from Don Bach to questions from TRC mtg 6/28/12 re: Singulair TNT & Singulair Green TNT
- Long summary of Presby Environmental, Inc. application for Advanced Enviro-Septic Treatment System (TSS & BOD)
- Short summary of Presby Environmental, Inc. application for Advanced Enviro-Septic Treatment System (TSS & BOD)
- Example Eljen leachfield design, to compare to the AES leachfield example designs at the end of the short summary

Review of Draft Minutes of June 28, 2012
- Page 1, beneath "Norweco, Inc. Technology Application for Singulair 960 TNT and Singulair Green 960 TNT for Nitrogen Removal", in the last sentence of the first paragraph, deleted "data" as follows: "…provided the ~~data~~ Standard 245 data meet the criterion of…".
- Page 1, at the end of the same sentence, add: "(the Standard 245 requirement is for 50% N-removal, but not 19 mg/L)".
- Page 4, near the top of the page, in the paragraph that begins "There was agreement that it was disturbing ….": Add to the last sentence: ", but greater than 50% for the other months."

Motion: George made a motion to approve the minutes with the corrections noted.
Second: Dennis seconded the motion.
Discussion: There was no discussion.
Vote: All who were in attendance at the meeting June 28th voted in favor of the motion (David & Nikki abstained, as they were not in attendance at the meeting).

Presby Environemntal, Inc. Application for Advanced Enviro-Septic for TSS & BOD Reduction
A second AES binder from Presby Environmental, Inc. was delivered to Deb by Federal Express the day before the meeting and she distributed these. Deb did not find out if this was to replace, or supplement the material in the original binder and she didn't have time to read it yet. There was a lot of material in the original binder and therefore two summaries are provided: the first version was 16 pages, so she pared that down to 7 pages and provided both to the TRC via email.

The most unusual attributes of the product are that it is both a treatment and dispersal system (it is passive unless a pump is required to gain elevation to AES) and the line spacing is much closer together than any of the leachfield configurations currently in use in RI. Deb prepared a sample Eljen leachfield design for comparison to the sample field designs for AES at the end of the short summary.

Russ noted that **MADEP's approval has a note that the smallest AES bed size allowed is 400 square-feet**.

High strength waste is accommodated by requiring a greater length of pipe.

Effluent filters are not recommended because they can restrict air movement into the AES. The use of an alarm with the effluent filter may help because this would require the homeowner to perform or provide for the required maintenance.

Noel asked about vertical separation to the seasonal high groundwater table. He noted that we want as much earth as possible between the bottom of an infiltrative surface and the seasonal high groundwater table for phosphorous adsorption by the soil.

NH approval letter: waiver of 1014.01(a-d) to allow the following sep to SHWT:
For ≤ 600 gpd: 2' vert sep from bottom of AES pipe, 18" from bottom of 6" specified sand layer;
For > 600 gpd: 30" vert sep from bottom of AES pipe, 24" from bottom of the 6" specified sand layer.

NH approval letter: waivers of 1014.01(a)(5) to allow the following sep to bedrock:
30" vert sep from bottom of AES pipe or 24" from bottom of 6" specified sand layer

Dennis Fogg of Presby Environmental, Inc. (PEI) introduced himself and the two other representatives present. Dennis made a presentation on AES. They are **requesting a Class One approval** because of the four years of testing and over 300 samples/data points. He explained that 300 observations is more data than would have been collected under the RIDEM OWTS Rules for Class One: 10 systems sampled four times a year for four years, which would provide only 160 observations on the 10 systems. AES was approved in 2010 in Maine, New Hampshire, Ohio and Vermont. They encourage state regulators to call the NH Subsurface Bureau, or Bill Evans for support of the great success using AES in NH. George asked where less than 600 and greater than 600 came from. Dennis stated that this is from a study that indicated that 2-feet is safe and conservative (no reference was cited).

The **reduction in leachfield size (AES compared to other leachfields) is justified by** 1000s of installations throughout the country over 17-years of successful use; **over 4,000 installations of AES** and over 100,000 installations of ES (Enviro-Septic, the one without the white geotextile "bio-accelerator"). PEI doesn't have records on all installations and where they are. Some states require installers to send information on systems they install, but this information is not actually provided as required. He explained that AES is designed with a **smaller field than other leachfields, because the soils are not required to treat, since AES is providing treatment**. He explained that particulate is captured in the pipe and is digested over time. AES treatment rivals mechanical treatment devices. It **accommodates sloped and curving installations** and no tools are needed to assemble it. **Maintenance** is limited to checking the septic tank for need of pumping and checking to see that the vents are not blocked. Presby Environmental, Inc. offers free **training and lifetime technical support**.

Dennis explained that the exterior geotextile is the surface at which the **biomat** develops. At the end of a row, there is an off-set adapter which is always set with the opening in the 12:00 position, so that the pipe must fill before effluent will flow to the next pipe (**serial distribution**); no distribution box is required and there is a vent at the end of the serial run. **Pressure distribution** may not be used. AES has a layer of geotextile fabric (bio-accelerator) that is at the bottom of the pipe; the seam in the exterior geotextile wrap must be placed at the top, making it easy to properly orient the pipe. This is easy to ensure, because the seam is a convenient way to pick up and place the pieces of pipe. The ends of the pipes are interconnected. Dennis explained that serial distribution ensures air flow through the entire field, so this is preferable, but PEI will allow use of a **distribution box**. Tim asked if the testing was performed with serial distribution. Dennis stated that the testing was performed with distribution boxes because BNQ mandates them.

Proper **venting** is critical to AES function. The **vent** is partially to provide protection against the future addition of soil over the field, which would reduce air flow into the AES. A minimum ten-foot differential between low and high vents is required. If a system is gravity, the roof vent for the home is sufficient as the high vent stack for the system. If the system requires a pump, a second high stack needs to be installed. These may be installed remote from the field and there was a slide of a golf course where this was done. Vents need to be placed above the anticipated snow depth. Dennis suggested that everyone review the section in the manual on by-pass venting, because there was no time to include in presentation. Tim asked if they provide venting guidance for older homes. Dennis explained that they need at least a three-inch diameter roof vent and that they will emphasize this in the RI design & installation guidance and at older homes, the septic tank needs to be checked for draft. Tim stated that the building code allows a minimum roof vent diameter of 2-inches. Dennis explained that this is acceptable, but they prefer 3-inches; with two-inches, they will need to install an additional vent, possibly associated with a second bathroom.

BNQ Class II testing protocol requires treatment to **30 mg/L for both BOD and TSS**. BNQ tested a full size AES system during 2005 and 2006 for one year and it was **this testing that resulted in the AES NSF certification to Standard 40**. The BNQ Class II testing used **12-inches of sand below the AES** pipe

BNQ Class III testing protocol requires treatment to **15 mg/L BOD and TSS**. AES was tested for one year in 2007 and 2008 under this protocol. The Class III testing has a fecal reduction requirement, so this testing protocol used **24-inches of sand below the AES**, because fecal removal increases with increasing depth of sand.

AES was tested for **one year in Belgium** and in **Massachusetts for 2 years**. PEI recommends using 6-inches of sand, so for the last two years AES has been undergoing testing at the Massachusetts Test Center with **6-inches of sand beneath the AES** pipe.

System Sand: minimum of 6-inches below, between, and above the ASE pipe. Remove organic and A horizon and scarify. Place the sand in the excavation, place (seam up) the AES pipe on the sand. Back fill carefully, gently compressing the sand and loam and seed. It is very important to use erosion control. Tim asked if there has been any work blending sand into the

natural soil horizon? Dennis stated that they do mix the sand into a few inches to create a transitional layer and that this is included in their training.

Anticipated distribution of AES in RI: Smithfield Plumbing is a RI-based company that services MA and NH and are interested in fulfilling RI's AES supply needs.

Design cost, Dennis believes is the same as traditional systems. PEI provides training and CAD drawings for designers. Construction cost is less than traditional systems, and can be 50-percent less, but the installer keeps some of this, so the actual cost reduction could be expected to be about 30-percent saving to the homeowner over a traditional system (**Knauss note**: is this 30-percent less than an AE system approved in RI for waste strength reduction and a leachfield?).

PEI will go and look at failures; they are interested to see what happened to the system and how it may be prevented. They no longer see new issues. The design is generally correct and failure is usually caused by improper venting, incorrect sand (the sand specification is very important). Rejuvenation may often be used to restore function of the system.

PEI would like RI approval for all the configurations in the NH manual included in the application binder, but recognizes differences among the states. They will develop a RI manual and will train designers and installers to this RI-specific manual. Eventually their training will be online (Presby University). PEI certification is required for all designers and installers.

Tim asked if **pumping the septic tank** every two to four years is the only maintenance, RI recommends pumping when accumulated solids are between about 35 and 50 percent. Dennis stated that PEI uses the same parameters.

Spacing: George asked about the requirement for 6-inches of sand between the pipes. Dennis stated that some designers are more conservative and increase this spacing.

Brian asked if AES may be used **following an advanced treatment system**. Dennis explained that the effluent will not provide enough food to create biomat, which is an important component of the treatment mechanism.

George stated that in RI **effluent screens** are required. Would use of an effluent screen affect the warranty? For example, if a system is designed and installed by certified professionals and there is a problem with the system, would the homeowner have the support of the PEI warranty even though the system was installed with an effluent screen? Dennis stated that use of an **effluent screen** wouldn't void the warranty, but that use of an effluent screen would make it very important that there is not too much **cover over the AES pipe (one-foot maximum)**, and that an effluent filter that allows air flow, even if clogged, is chosen. Tim noted before Dennis Fogg's presentation, in Appendix G **cover** is specified as 6-inches to 12-inches. RI requires 1.5-feet minimum cover and he asked if this would interfere with proper function of AES. (no answer is recorded in Deb's notes). The installer should do a draft test and make sure that the field is properly vented. PEI's objection to effluent filters is based on experience that homeowners don't provide the necessary maintenance, sometimes because they can't access the filter. Russ asked if the effluent filter clogs and the field is suffocated, will it be able to be revived? Dennis stated that it will, if the only problem was suffocation due to the clogged effluent filter. Since RI requires **effluent filters** Dennis stated that if RI approves AES and wishes to require effluent filters, PEI would like to talk about this.

Ken asked about **sludge in the AES pipe**. Dennis said that in Belgium they took the pipe apart after one year of testing and that although it looks dirty, there is **no sludge accumulation**.

Russ asked if they know the basis for the minimum field size of 400 square-feet stated in the MA approval and if this is a standard minimum in MA. Deb didn't write an answer and can't recall what the answer was.

George asked if AES is suitable for **seasonal uses**. Dennis stated that it is and that it is very successful and the biomat rejuvenated quickly (in a few weeks) when use resumes. AES was performing within 18-days in the NSF testing.

There was discussion regarding use of AES on **sloping sites.** Russ explained that an invert perimeter of 10-feet needs to be maintained before the 3 to 1 slope required in the RIDEM OWTS Rules (Rule 32.16). PEI wants the 10-feet reduced to at least 5-feet, supported by 80,000 installations in NH.

Norweco, Inc. Technology Application for Singulair TNT and Singulair Green TNT for Nitrogen Removal

This is the first application to be considered under the new provision in the RIDEM OWTS Rules allowing NSF Standard 245 Certification to fulfill the data and approvals component of a Class Two nitrogen removal application; the other approved technologies were reviewed and approved under greater scrutiny. The rule requires that the a preponderance of the NSF data meet the 19 mg/L standard for total nitrogen in the treated effluent and remove 50 percent of the influent total nitrogen. The NSF testing shows that the TNT was removing 68 percent TN and during the stress testing, the system got to 12 mg/L TN. The Maryland test data show higher TN concentrations in the treated effluent, but the influent strength is higher than the influent strength in the NSF testing (which averaged 38 mg/L and ranged between 15 and 58 mg/L).

Influent TN of 38 mg/L had been expected historically, which is how we arrived at 19 mg/L as a treatment standard. Now we often see influent TN concentrations in the 60's (mg/L), which is expected to be much more realistic. Russ stated that Maryland may be the most active other state with regard to code requirements for nitrogen removal systems and they now assumes an influent TN concentration of 60 mg/L. With acceptance of the observations that influent strength is higher now with the use of low-flow fixtures in homes, we are faced with the question of what is now a suitable performance requirement.

In Massachusetts, if each home's mean meets 50% TN removal and 19 mg/L, then that system meets the standard. 90% of the homes must meet this standard and in Massachusetts only one system meets this standard for General Use N-removal. Russ stated that we don't require every installation to be tested and that Bio-Microbics has submitted the first set of data on the three systems required for renewal of their N-removal certification. Maybe we need to collect data on more systems to help us make a decision on what is an appropriate N-removal treatment standard.

George noted that while RI has moved to accept NSF Standard 245, the Maryland data for Singulair TNT doesn't meet the RI standard and the Barnstable Report shows that only 60 percent of the systems are in compliance. Russ noted that under the new Rules, the Maryland data didn't need to be submitted since they have the NSF Standard 245 certification.

Massachusetts and Maryland made their decisions on performance and we need to accept that technologies are different and perform diffently. A decision needs to be made about where to draw the line on what meets and doesn't meet our standard, or perhaps re-define the standard.

David asked if there is room to require additional treatment with a PSND if a technology is marginal. Russ stated that while that hasn't been considered, it is an option.

Mike Benton stated that if cost to end user were not an issue, more nitrogen could be removed. The advantage of TNT is that the aerator only runs half the time. At about 14 cents a kilowatt hour, TNT costs only about $13 per month to run.

Mike stated that in Maryland where a $30 per year flush tax is used to fund the Bay Area Restoration Fund which helps to fund repairs and upgrades to N-removal, Norweco has sold more than the other three systems (approved for use under this program) combined. Nationally, there are more than 600,000 Singulair systems installed and over 50,000 of these are TNTs.

The request for use of Singulair Green in parallel has been withdrawn; Norweco, Inc. will make that request again in the future when they have data to support it.

Russ asked if rather than referring to the Singulairs as 500 & 600, Norweco, Inc. consider dropping the "500" from the RI approval language since it is one unit that is approved to treat up to 600 gpd. The 500 & 600 issue is generating confusion. Mike agreed to identify the units in RI using only the "600".

Russ introduced the issue of a second RI N-removal certification for Singulair (the original having been issued to Siegmund Environmental Services, Inc. (SESI) for their version that recirculates) if an approval is issued for TNT and asked where we stand on the issue of SESI retracting their approval. Mike replied that they don't see a down side to having two N-removal approvals for Singulair. Russ explained that it has been confusing for regulators, design professionals and the TRC.

Deb asked Mike about the distinction associated with "960". Although Don didn't articulate this in this reply (letter dated 7/23/12), only the TSS & BOD removal systems listed in this letter appear with "960". Is it correct that "960" identifies TSS & BOD removal exclusively? Mike replied that this is correct.

Training in Ohio is required for distributors; NEHA has certified the training for 6 CEUs. This training covers general design, but not in detail since local requirements are very different. Russ stated that RI requires local training, within 50-miles of RI. Mike stated that Norweco makes training materials made available for distributors' use.

There was discussion regarding the collection of additional data because of the concern that the MD data mean TN concentrations don't meet the RI requirement of 19 mg/L. We could require influent testing and describe a method for collecting it. Mike was concerned about other systems' approvals not having similar requirements. Russ replied that we are currently looking at only the application for TNT, which is the first one to be considered under the new Class Two N-removal provisions and also, over the years the elements of approvals change and we incorporate the new elements into other certifications when they are renewed.

Dennis V. stated that influent and effluent demonstrate 50% removal but not 19 mg/L TN. There was discussion about concentration as a function of water use and how to deal with this: test more than three systems (as has been required of Class Two approvals), test influent and effluent, consider loading?

Hollister stated that they have data from 14 TNTs installed in MA and asked if it would it be beneficial if they submit this. George suspects that additional data would only support that we need to look at system performance more carefully.

Russ asked if anyone wanted to make a motion to approve, deny, or take no action on Norweco, Inc.'s application for Singulair TNT for N-removal (under the new OWTS Rules for Class Two N-removal). Noel recommended to approve with additional testing: the minimum of three (currently required under Class Two certifications) is not enough to demonstrate the performance of the TNTs with consideration of the data that have been reviewed under the approval (the NSF 245 data and the Maryland data). Noel also recommended that they continue to monitor the installations that are currently being monitored and he recommended that the TRC/DEM, should be able to approve of the third party that is named for collection of the samples in RI.

George said sampling will cost money and he doesn't want this cost passed on to the homeowner, because this is a term of the product approval and passing this cost on to the homeowner is not appropriate. Russ said that we write this part of the certifications making it the responsibility of the vendor, but if they pass the cost on, there isn't anything we can do about it. If we require testing on the first 20 systems, then maybe it won't be passed on to the homeowner. David noted that gives the vendor an opportunity to pass this cost to more people and not just three homeowners.

Russ asked if the TRC is agreeing to recommend approving the technology based on some number of systems meeting the treatment standard (of 19 mg/L TN and 50% removal of influent TN), with the number of systems somewhere between 3 and 10? George stated that a minimum of 20 systems should be monitored under this new NSF standard 245 approval for N-removal systems. Discussion continued on how to determine a suitable sample size (number of systems to require for monitoring under a Class Two N-removal certification issued based on NSF-245 certification) and is summarized below.

Systems should be identified for sampling and be sampled until we have obtained some number of "representative" systems (some minimum number of seasonal and full-time occupancy) and the data proves the claim, <u>but under what parameters</u>? Some of the systems selected may be getting ½ the required O&M and not meeting the N-removal standard or others are receiving the required O&M and are hitting the treatment standard. Russ asked about tying the sample collection to the maintenance visits. George stated that we wouldn't want the testing to be done at the same time as the O&M work because O&M activities are perturbing the system. It would be imperative to sample the system before any other work is done. This however, would preclude a third party doing the sampling, because the third party would not be the entity doing the O&M.

Dennis V. stated that composite versus grab sampling is an issue we need to consider. We'd need to define the **sample type required and the methodology**. For example: composite sample collected over a 24-hour interval, or a single grab sample. Time dosed systems discharge very metered flow, so a grab sample may work for these systems, but may work against the vendor of systems that are socially dosed (gravity discharge). It was noted that composite samplers cost money, but Dennis stated that certified labs should have composite samplers. George added that the labs (personnel) need to be familiar with the treatment technology. There was discussion about influent sampling and from where specifically influent samples should be taken.

Tim: if we're requiring all systems to be monitored, for gravity discharge systems where should the samples be collected? A final sampling port would have to be added, or the sample could be taken from the d-box. George suggested that a 15-inch PVC inlet and outlet port could be installed. Hollister said that this how they are doing it in MA. (Installation of the inlet and outlet ports presumably, but exactly where is not clear). Treated effluent sampled after the tank from a 15-inch diameter PVC port before the d-box perhaps, but are they sampling influent and if so, where is the port installed, immediately before the TNT tank? ***Deb wonders why not use the dbox, unless bringing the dbox to grade is a more expensive configuration.***

Russ noted that there is some support for recommending approval with testing required of all installations, until it is determined that a suitable number of representative systems is being monitored. Sampling will be performed quarterly, with samples collected from outlet ports in gravity distribution systems.

Motion: made by Noel Berg to recommend approval of the Norweco, Inc. Singular TNT for N-removal, under the new OWTS Rules provision for Class Two N-removal approval accepting NSF 245 certification to fulfill the data and approvals elements of the approval. The recommendation includes quarterly sampling of all of the systems installed under this approval until a suitable (to be defined) number of representative (seasonal and year-round occupancy) are being sampled by a third party approved by the TRC/DEM.
Seconded by Tim Stasiunas and Dennis Vinhatiero.
Discussion:
George stated constituents monitored need to be specified. Russ stated that these would be the same as the other certifications that have been issued.

Ken asked if there will be a maximum number of systems that may be installed under the certification. Russ stated that there will be no maximum.

Dennis asked if "representative sample" should be defined so that this specification is not arbitrary, and if so, how?

Russ stated that year-round use would provide better data on how the system performs under constant use. We could specify this and add it to the conditions of the certification.

Dennis suggested that DEM might need to discuss the proposed monitoring with DEM legal counsel to make sure that what is defined is defensible.

David: it may also be more beneficial to the vendor to sample more systems so they have a better average with more systems' performance considered.

Ken asked if the standard these systems must meet is 50% reduction of influent TN and a preponderance of less than 19 mg/L TN and George stated that we need to establish what is "meeting" the standard, for example, 80% of the systems sampled are in compliance with the treatment standard. Russ noted that discussion on the definition of compliance is not part of the motion to recommend approval of the technology because it relates to how we will evaluate performance.

It was suggested that we should look at municipal treatment plants' permit terms and limits and Russ added that we should also consider large OWTS with operating permits, such as Massachusetts issues. Although we wouldn't include max day and max hour limits, it may be helpful to consider these terms in our investigation of the issue of how to define compliance.

Motion: made by Noel Berg to recommend approval of the Norweco, Inc. Singular TNT for N-removal, under the new OWTS Rules provision for Class Two N-removal approval accepting NSF 245 certification to fulfill the data and approvals elements of the approval. The recommendation includes quarterly sampling of all of the systems installed under this approval until a suitable (to be defined) number of representative (seasonal and year-round occupancy) are being sampled by a third party approved by the TRC/DEM.
Seconded by Tim Stasiunas and Dennis Vinhatiero.
All present voted in favor of the motion.
There were no abstentions and no one voted to oppose the motion.

Adjournment and Next Meeting
Due to the time, Russ stated that we would need to put off discussion of the remaining topics on the agenda (Regulatory Changes to address concerns of SC towns/Update following 5/3/12 hearing, Nitrex issue Update, Large AE System Compliance Update and Monthly AE program status report/update) until the next meeting.

The next meeting was scheduled for October 25th, pending availability of a meeting venue and the meeting adjourned.